

Appl. No. 10/709,278
Amdt. dated December 28, 2005
Reply to Office action of September 29, 2005

Amendments to the Claims:

Listing of Claims:

Claim 1 (currently amended) A damascene process capable of avoiding via resist poisoning, the damascene process comprising:

- 5 providing a semiconductor substrate with a low-k dielectric layer $(k \leq 2.9)$ thereon, a SiC layer over the low-k dielectric layer, a metal layer over the SiC layer, and a first bottom anti-reflection coating (BARC) layer over the metal layer;
- 10 forming a first resist layer on the first BARC layer, wherein the first resist layer has a trench opening to expose a portion of the first BARC layer;
- etching through the first BARC layer and the metal layer and etching a portion of the SiC layer to form a trench structure in the SiC layer;
- 15 removing the first resist layer and the first BARC layer;
- forming a blocking layer on the surface of the trench structure of the SiC layer, wherein the blocking layer is used to prevent unpolymerized precursors diffused out from the low-k dielectric layer from contacting an overlying resist;
- 20 forming a second BARC layer on the blocking layer, the second BARC layer filling the trench structure;
- forming a second resist layer on the second BARC layer, the second resist layer having a via opening to expose a portion of the second BARC layer;
- 25 etching through the second BARC layer, the SiC layer, and the blocking layer, and etching a portion of the low-k dielectric layer to form a via structure in the low-k dielectric layer;
- removing the second resist layer and the second BARC layer; and

Appl. No. 10/709,278
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performing a dual damascene process using the metal layer and the SiC layer as masks to make the low-k dielectric layer form a dual damascene structure having the trench and the via structure.

5 Claim 2 (original) The process of claim 1 wherein the blocking layer is formed by Ar plasma hitting the SiC layer.

Claim 3 (currently amended) The process of claim 2 wherein the Ar plasma comprises a ~~fluorane~~ fluorine substance.

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Claim 4 (currently amended) The process of claim 3 wherein the ~~fluorane~~ fluorine substance is CF₄.

15 Claim 5 (original) The process of claim 1 wherein the low-k dielectric layer comprises a carbon-doped oxide (CDO) substance.

Claim 6 (original) The process of claim 1 wherein a dielectric layer is set between the metal layer and the first BARC layer.

20 Claim 7 (original) The process of claim 1 wherein the thickness of the SiC layer is less than 700 angstroms.

25 Claim 8 (currently amended) A damascene process capable of avoiding via resist poisoning, the damascene process comprising:
providing a semiconductor substrate with a low-k dielectric layer_($k \leq 2.9$)_thereon, and a SiC layer over the low-k dielectric layer;
forming a blocking layer on the SiC layer, wherein the blocking layer is used to prevent unpolymerized precursors diffused out from

Appl. No. 10/709,278

Amdt. dated December 28, 2005

Reply to Office action of September 29, 2005

the low-k dielectric layer from contacting an overlying resist;
forming a BARC layer on the blocking layer;
forming a resist layer on the BARC layer, wherein the resist layer has
a via opening to expose a portion of the BARC layer; and
5 etching through the BARC layer, the blocking layer, and the SiC layer,
and etching a portion of the low-k dielectric layer to form a
single damascene structure in the low-k dielectric layer.

Claim 9 (original) The process of claim 8 wherein the blocking layer is
10 formed by Ar plasma hitting the SiC layer.

Claim 10 (currently amended) The process of claim 9 wherein the Ar
plasma comprises a ~~fluorane~~ fluorine substance.

15 Claim 11 (currently amended) The process of claim 10 wherein the ~~fluorane~~
fluorine substance is CF₄.

Claim 12 (original) The process of claim 8 wherein the low-k dielectric
layer comprises a carbon-doped oxide substance.
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Claim 13 (original) The process of claim 1 wherein the thickness of the SiC
layer is less than 700 angstroms.